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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

(In re patent
appln. of:

Michio HORIUCHI
et al.

Serial No: 09/826,512

Filed: 04/05/2001

For: **WIRING SUBSTRATE,
METHOD OF MANUFACTURING
SAME, AND SEMICONDUCTOR
DEVICE**

Examiner: Jose H. Alcala

Art Unit: 2841

Docket No.: 089-01

Box Non-fee Amendment
Commissioner for Patents
Washington, D.C. 20231

<p>CERTIFICATE OF MAILING DATE OF DEPOSIT: June 26, 2002 I hereby certify that this correspondence is being deposited with the United States Postal Service, postage paid, as first class mail under 37 C.F.R. §1.8, on the date indicated above and is addressed to Box Non-fee Amendment, Commissioner for Patents, Washington D.C. 20231.</p> <p>Name of person mailing paper or fee: Ourmazz S. Ojan</p> <p>Signature: <i>Ourmazz S. Ojan</i></p>
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#8/C
Amend
J. Macmillan
7/18/02

AMENDMENT

Sir:

This communication is responsive to the Office Action mailed on March 28, 2002, and having a three-month shortened statutory period for response set to expire on June 28, 2002. This amendment is being filed within the shortened statutory period for response, and accordingly no additional fees are believed to be due at this time.

In the event that additional fees are required with respect to this communication, the Commissioner is hereby authorized to charge any such fees, or credit any overpayment, to Paul & Paul deposit account number 16-0750.

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Please amend the application as follows:

IN THE CLAIMS

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Please amend claims 1 and 12 as follows:

C1
1. (Amended) A wiring substrate equipped with a rerouted wiring having one end connected to an electronic-part mounting pad for electrically connecting an electronic part and another end connected to an external-connection terminal, in which said wiring substrate comprises a base body having selectively formed thereon a low-elasticity underlayer, made of a material having a lower modulus of elasticity than that of the base body, in a pattern that the external-connection terminal is exposed in a surface of the base body, said underlayer being positioned between the base body of the wiring substrate and each of the electronic-part mounting pad and the rerouted wiring.

C2
12. (Amended) A semiconductor device comprising a wiring substrate equipped with a rerouted wiring having one end connected to an electronic-part mounting pad for electrically connecting an electronic part and another end connected to an external-connection terminal, and an electronic part electrically connected and mounted on the pad of the wiring substrate, in which said wiring substrate comprises a base body having selectively formed thereon a low-elasticity underlayer, made of a material having a lower modulus of elasticity than that of the

Cont'd
C2 base body, in a pattern that the external-connection terminal is exposed in a surface of the base body, said underlayer being positioned between the base body of the wiring substrate and each of the electronic-part mounting pad and the rerouted wiring.

REMARKS

Marked-up versions of the amended claims, showing additions underlined and deletions bracketed, are attached hereto in accordance with 37 C.F.R. §1.121(c)(1)(ii).

Claims 1-23 are pending in the present application. Of these claims 2-11, 15-18, and 20-23 have been withdrawn from consideration by the Examiner as being drawn to a non-elected invention. Claims 1 and 12 have been amended by the present amendment. Claims 1, 12-14, and 19 remain for consideration by the Examiner.

In the Office Action, the Examiner rejected all the elected claims 1, 12, 13, 14 and 19 under 35 USC 102(e) or 103(a), referring to Imasu et al., USP 6,208,525, the US counterpart of Japanese Unexamined Patent Publication (Kokai) No. 10-270496 cited and described in page 3, line 20 to page 4, line 10, of the specification. However, USP `525 does not teach the wiring substrate and semiconductor device of the present invention, because the semiconductor device of USP `525 is clearly distinguished from that of the present invention in view of the

constitution and functions of the soft layer 3 used therein, as described hereinbelow.

To clarify the gist of the present invention, thereby distinguishing the present invention from USP `525, claims 1 and 2 have been amended as shown above and in the attached marked-up version of the amended claims. The claim amendments are fully supported in the specification and drawings as originally filed. Claims 1 and 12 as amended set forth that the low-elasticity underlayer is selectively formed on the base body of the wiring substrate in such a manner that the external-connection terminal is exposed, while the low-elasticity underlayer underlies the rerouted wiring and the electronic-part mounting pads. This claimed arrangement allows the rerouted wiring to relieve any stresses that may build up, for example due to thermal expansion, without imparting those stresses to the external-connection terminal which is more rigidly supported than the rerouted wiring. This property of the present invention is enhanced by the nonlinear pattern of the rerouted wiring as set forth in claim 19, because stress is more efficiently relieved by bending than by compression as would be the case in a linear wiring pattern. With the claimed structure of the present invention, it becomes possible to allow some bending of the rerouted wiring without causing disconnections in the wiring, thereby making the device compact and improving workability and

reliability, as is disclosed on page 15, lines 2 to 24 of the specification.

Contrary to the Examiner's assertion, item 20 of Imasu et al. (USP `525) is not an external-connection terminal, but it is an IC package. The Imasu et al. patent is directed to solve the problems caused upon filling of an adhesive (16) between an electrode pad (4A) of the wiring board (1) and a bump electrode (15) of the semiconductor chip (10), which are entirely different from the problems addressed by the present invention. Furthermore, as illustrated in USP `525, the soft layer (3) is formed on an entire surface of the wiring board (1), whereas according to the present invention, as recited in amended claims 1 and 12, the underlayer (3) is selectively formed so as to cover only the area excluding the external-connection terminal. Therefore, the claimed invention of the present application is not taught or suggested by Imasu et al. and claims 1 and 12 should be allowable over the applied art.

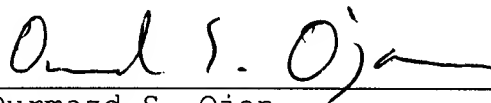
Claims 13, 14, and 19 depend from claim 1 and should therefore also be allowable over the applied art.

For the reasons enumerated above, the claims as amended should be in condition for allowance. Therefore, Applicant respectfully urges that the application is in condition for allowance and a notice to that effect is earnestly solicited. If in the Examiner's opinion that is not the case, the Applicant asks that the Examiner kindly contact the undersigned by telephone in

an effort to resolve any outstanding issues as expeditiously as possible.

Respectfully submitted,

Date: June 26, 2002



Ourmazd S. Ojan
Registration No. 38,065
Paul and Paul
2900 Two Thousand Market Street
Philadelphia, PA 19103
(215) 568-4900

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